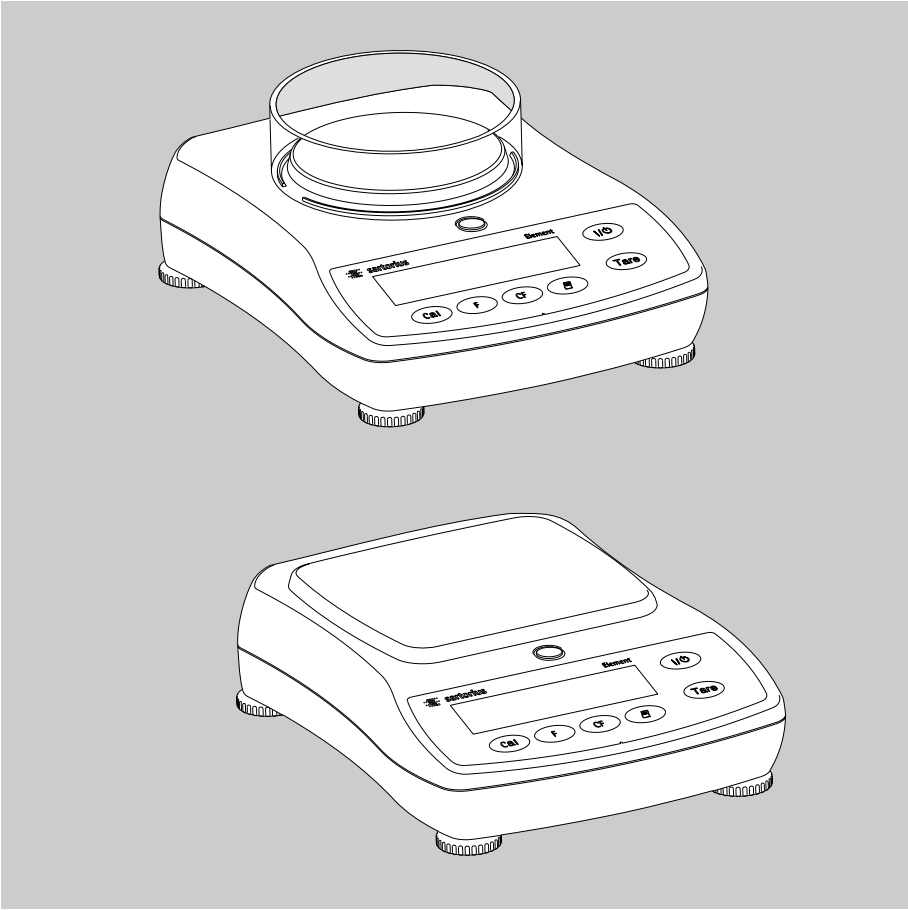
sartorius

Operating Instructions

Sartorius Element Series

Electronic Precision Balances, Electronic Gem Scale



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Warnings and Safety Precautions

Safety Information

● To prevent damage to the equipment, please read these operating instructions carefully before using your balance/scale.

⚠ Do not use this equipment in hazardous areas.

⚠ Make sure the voltage rating printed on the power supply is identical to your local line voltage.

⚠ Use only commercially available non-rechargeable or rechargeable battery: 8 × AA, Mignon (not included). The rechargeable batteries are not charged when you use the AC adapter. Please use the charger to recharge the batteries outside the balance/scale.

– The balance/scale is energized at all times unless you disconnect the AC adapter and, if connected, the battery.

– Protect the AC adapter from contact with liquid

⚠ Exposure to excessive electromagnetic interference can cause the readout value to change. Once the disturbance has ceased, the instrument can be used again in accordance with its intended purpose.

Installation

– It is recommended to connect Sartorius accessories and options, as these are optimally designed for use with your balance.

– Do not open the balance/scale housing as this may void the manufacturer’s warranty.

Getting Started

Equipment Supplied

- Balance/scale
- Weighing pan
- Plug-in AC adapter
- Level indicator and adjustable feet

Additional equipment with models ELT602, ELT402, ELT202, ELT1001, ELT601:

- Calibration weight

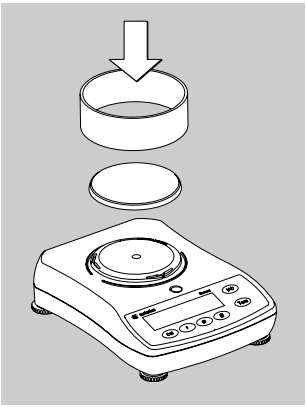
Additional equipment with model ELT103, GD502:

- Calibration weight
- Round glass draft shield
- Only with GD502: Gem tray

Installation

Choose a location that is not subject to the following negative influences:

- Heat (heater or direct sunlight)
- Drafts from open windows and doors
- Extreme vibrations during weighing
- Excessive moisture

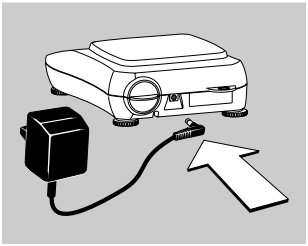


Setting Up the Balance/Scale

- Place the components on the balance/scale in the following order:

- Weighing pan
- Round glass draft shield on model ELT103, GD502

⚠ Use only original Sartorius AC adapters:
– for Asia: 400081.1
– for the U.S.: 400314.1

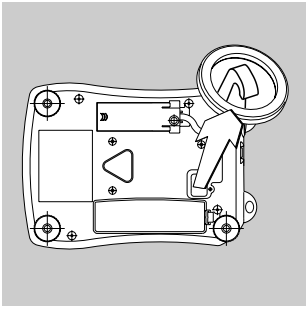


Connecting the Balance/Scale to AC Power

● Insert plug into the jack (located on back of the balance/scale)

● Plug the AC adapter into an electrical outlet

⚠ LISTED power supply 11 V–21 V compliant with NEC Class 2 output.



Below-Balance/Scale Weighing

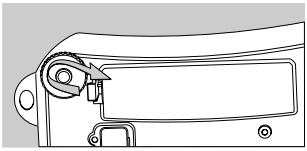
A port for a below-balance/scale weighing hanger is located on the bottom of the balance/scale.

● Open the cover plate on the bottom of the balance/scale.

● Attach the sample (e.g., using a suspension wire) to the hanger.

○ Install a shield for protection against drafts if necessary.

Using a Non-Rechargeable/Rechargeable Battery
(not for model ELT103, GD502)



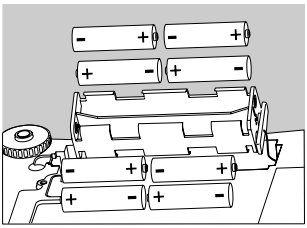
○ A non-rechargeable or rechargeable battery is not included with the equipment supplied.

⚠ Use only a commercially available non-rechargeable (8× AA/Mignon) or rechargeable battery.

⚠ When using a rechargeable battery, be sure to recharge it outside the balance/scale using a separate charger.

● Lay the balance/scale on its side

● Lift the compartment cover

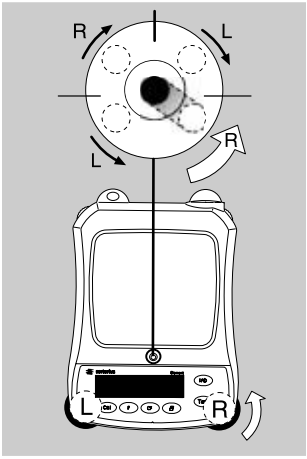


● Insert the non-rechargeable (8× AA/Mignon) or rechargeable batteries into the compartment.

○ Make sure to connect the positive and negative poles correctly.

● Close the battery compartment: press down on the cover until it clicks into place.

⚠ All used batteries are classified as waste that requires special handling (not “household” waste). Dispose of rechargeable batteries in accordance with the applicable special waste disposal regulations.

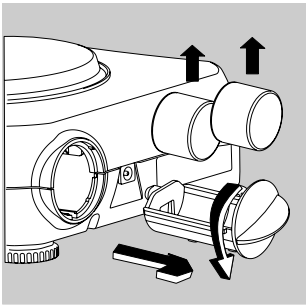


Leveling the Balance/Scale

- Always level the balance/scale again any time after it has been moved to a different location.
  Example: moving bubble from R to L

- Turn the feet as shown in the diagram until the air bubble is centered within the circle of the level indicator.

> In most cases this will require several adjustment steps.



Removing Weights for Calibration/Span Adjustment
(only for models ELT103, ELT602, ELT402, ELT202, ELT1001, ELT601, GD502)

- Grasp the tab to turn and pull out the weight compartment.

○ Follow instructions on page 14 for calibration/span adjustment.

Operation

Basic Weighing Function
Features

– Zeroing the balance/scale
You can zero the balance/scale within the entire weighing range, up to the maximum capacity.

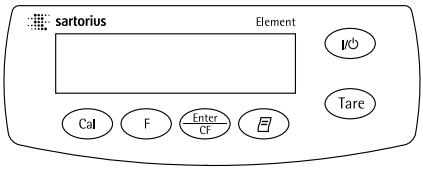
Preparation

● Switch on the balance/scale: press the (I/⏻) key
● If necessary, zero the balance/scale: press the (Tare) key
○ If necessary, change the configuration settings: see the chapter entitled "Configuration"
○ If desired, load the factory settings: see the chapter entitled "Configuration," menu item 9.– 1

Additional functions

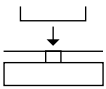
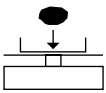
○ Switching off the balance/scale: press the (I/⏻) key
○ Battery operation: automatic shut-off after 2, 5 or 10 minutes; see chapter on configuration. Example: 2 minutes. If the weight readout remains unchanged and no keys are pressed for at least two minutes, the battery symbol " ▬ " starts flashing. After another 2 seconds, the balance/scale shuts off automatically, unless a key is pressed.

Description of the Keys



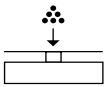
(I/⏻) On/off key: switches the balance/scale on and off or switches it to the standby mode.
Battery operation: on; turns backlight on; off
(Tare) Press less than 2 seconds: zeros the balance/scale
Press and hold 2 seconds: opens the application menu
(CAL) Starts calibration/adjustment
(F) Starts an application program
Scrolls in the application, configuration and in the calibration menus
(Enter/CF) Confirms the selected setting; exits application, configuration & calibration menu if key is pressed and held for at least 2 seconds.
(🖹) Generates a printout or data output

Example: Determine weight of sample

Step	Key (or instruction)	Display
1. Switch on the balance/scale Self-test runs Display: Software version	(I/⏻)	8.8.8.8.8.8 r 31.01
2. Place container on the balance/scale (in this example, 52 g)		52.0 g
3. Zero the balance/scale	(Tare)	0.0 g
4. Place sample in container on balance/scale (in this example, 150.2 g).		150.2 g

Application Programs

Toggling between Weight Units
With this application program you can toggle the display of a weight value back and forth between two weight units (see table below).
Example: Toggle weight unit from pounds [lb] (application) to grams [g] (basic unit)

Step	Key (or instruction)	Display
1. Select application program	(Tare) ≥ 2 sec	1.noAPP
2. Select Toggling between Weight Units	(F)	2.un It
3. Confirm unit	(Enter CF)	2.GrAMS
4. Select weight unit; in this example: "5. Pounds" (see table below)	(F) repeatedly	5.Pound
5. Confirm weight unit (pounds)	(Enter CF)	0.0000 lb
6. Place sample on balance/scale		0.2204 lb
7. Toggle weight unit	(F)	100.0 g

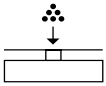
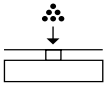
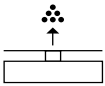
Menu code	Unit	Conversion factor	Display
1. uSEr [1])	Grams	1.00000000000	o
2.GrAMS (fact. setting ELT models)	Grams	1.00000000000	g
4.CArAt (fact. setting GD502)	Carats	5.00000000000	o
5.Pound	Pounds	0.00220462260	lb
6.ounCE	Ounces	0.03527396200	oz
7.trYo	Troy ounces	0.03215074700	ozt
8.tL.Hon	Hong Kong taels	0.02671725000	tlk
9.tL.S in	Singapore taels	0.02645544638	tl
10.tL.tA	Taiwanese taels	0.02666666000	tl
11.GrA1	Grains	15.4323583500	GN
12.PEnY	Pennyweights	0.64301493100	dwt
15.tL.CH	Chinese taels	0.02645547175	tl
22.Pdo2	lb/oz	0.03527396200	lb:oz
23.nEWt	Newtons	0.00980665000	N

[1]) User-defined conversion can be loaded in balance with RS-232 or USB program option.

Counting

Purpose
With the Counting program you can determine the number of parts or items by weighing.

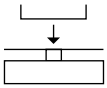
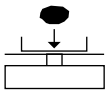
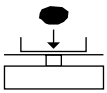
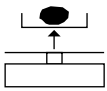
Example: Determine the number of uncounted parts; weigh in the selectable reference sample quantity (in this example: 20)

Step	Key (or instruction)	Display
1. Select application program	Tare ≥ 2 sec	noAPP
2. Select Counting	F repeatedly	Count
3. Confirm setting Symbol "✱" on the display: application is active	Enter CF	0.0 g ✱
4. Place empty container on the balance/scale		100.0 g ✱
5. Zero the balance/scale	Tare	0.0 g ✱
6. Place reference sample quantity (20) on the balance/scale		66.0 g ✱
7. Select reference sample quantity: in increments of 1 (1, 2, 3, ..., 99) or in increments of 10 (10, 20, 30, ...,100)	F repeatedly (briefly) or F ≥ 2 sec.	
8. Confirm selected reference sample quantity	Enter CF	? 20
9. Place uncounted parts on balance/scale		20 pcs ✱
10. Toggle display between mean piece weight, total weight, and quantity	F repeatedly	512 pcs ✱
11. Unload the balance/scale		3.300 g ✱ ▲
12. Counting application: clear the reference value	Enter CF ≥ 2 sec	
13. Reactivate Counting (if no other application program has been selected)	F	
14. Repeat procedure starting from Step 5		

Weighing in Percent

Purpose
This application program allows you to obtain weight readouts in percent which are in proportion to a reference weight.

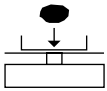
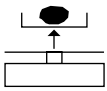
Example: Determine an unknown percentage; store the weight on the balance/scale as the reference percentage (100%)

Step	Key (or instruction)	Display
1. Select application program	Tare ≥ 2 sec	noAPP
2. Select Weighing in Percent	F repeatedly	%PErCt
3. Confirm setting Symbol "✱" on the display: application is active	Enter CF	0.0 g ✱
4. Place empty container on the balance/scale		100.0 g ✱
5. Zero the balance/scale	Tare	0.0 g ✱
6. Place the reference weight for 100% on the balance/scale		222.5 g ✱
7. If desired, change the number of decimal places displayed: 100.0%, 100.00% or 100% (factory setting)	F repeatedly	? 100.00
8. Confirm selected no. of decimal places	Enter CF	100.00 % ✱
9. Place unknown weight on the balance/scale		144.94 % ✱
10. Toggle display between weight and percentage	F repeatedly	322.5 g ✱
11. Unload the balance/scale		
12. Weighing in Percent application: clear the reference percentage	Enter CF ≥ 2 sec	
13. Reactivate Weighing in Percent (if no other application program has been selected)	F	
14. Repeat procedure starting from Step 5.		

“Hold” Display

Purpose
The last stable value remains displayed for 5 seconds after removing the sample from the pan.

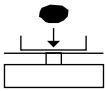
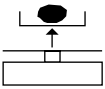
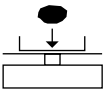
Example: Determine weight of oversized sample

Step	Key (or instruction)	Display
1. Select application program	(Tare) ≥ 2 sec	
2. Select Display Hold (“HL don”)	(F) repeatedly	
3. Confirm setting Symbol “✱” on the display: application is active	(Enter CF)	
4. If necessary: zero the balance/scale	(Tare)	
5. Place sample on balance/scale		
6. Start application program	(F)	
Symbol “⚠” flashes on the display: the weight value is locked		
7. Unload the balance/scale: the weight value remains displayed for a further 5 seconds; or		
8. Zero the balance/scale	(Tare)	
9. End the Display Hold application	(Enter CF) ≥ 2 sec	
10. Reactivate Display Hold (if no other application program has been selected)	(F)	
11. Repeat procedure starting from Step 5.		

Totalizing

Purpose
With this application program you can add up successive weight values exceeding the capacity of the balance/scale.

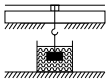
Example: Totalizing weight values

Step	Key (or instruction)	Display
1. Select application program	Tare ≥ 2 sec	InoAPP
2. Select Totalizing	F repeatedly	totAL
3. Confirm setting Symbol "✱" on the display: application is active	Enter CF	0.0 g ✱
4. If necessary: zero the balance/scale	Tare	
5. Place sample on balance/scale (in this example, 380 g)		380.0 g ✱
6. Store value in memory. Total weight is displayed steadily; Σ symbol flashes.	Enter CF	380.0 Σ✱ g
7. Remove sample from balance/scale		
8. Place the next sample on the balance/scale (in this example, 575 g)		575.0 Σ✱ g
9. Store value in memory. Totalized stored weight is displayed; symbol Σ flashes. Note: Σ symbol remains on indicating stored value in memory until cleared	Enter CF	955.0 Σ✱ g
10. To view the current weight for 2 seconds (if a printer is connected, a printout is generated)	F	575.0 Σ✱ g
11. Clear totalizing memory (if a printer is connected, total is printed)	F ≥ 2 sec	
12. End Totalizing	Enter CF ≥ 2 sec	
13. Reactivate Totalizing (if no other application program has been selected) (if a printer is connected, total is printed).	F	0.0 g ✱
14. Repeat procedure starting from Step 6.		

Specific Gravity

Purpose
Use this application program to determine the specific gravity of a sample. The result is displayed with one decimal place. Beaker and wire not included with balance/scale.

Example: Determine the specific gravity of a solid.

Step	Key (or instruction)	Display
1. Select application program	(Tare) ≥ 2 sec	noAPP
2. Select Specific Gravity	(F) repeatedly	SPEGr
3. Confirm setting Symbol "✱" on the display: application is active	(Enter CF)	0.0 g ✱
4. If necessary, zero the balance/scale	(Tare)	
5. Start application program	(F)	AIrUAL
6. Confirm the display, "AIrUAL"	(Enter CF)	20.0 g ✱
7. Determine weight of the sample in air: place sample on the balance/scale		
8. Store weight-in-air value	(Enter CF)	WAtEr
9. Remove sample from balance/scale		
10. Determine weight of sample in liquid: connect wire and set up beaker		
11. Confirm the display "Water"	(Enter CF)	15.0 g ✱
12. Place sample in liquid		
13. Store the weight-in-liquid value and view the result	(Enter CF)	4.0 s ✱
14. Clear the display	(Tare)	
15. Exit the Specific Gravity application	(Enter CF) ≥ 2 sec	
16. Reactivate Specific Gravity (if no other application program has been selected)	(F)	0.0 g ✱
17. Repeat procedure starting from Step 5.		

Calibration/Span Adjustment

Calibration is recommended after initial installation and each time the balance/scale is moved.

Features

Calibration/adjustment can be performed only when:

- there is no load on the balance/scale,
- the balance/scale is zeroed, and
- the internal signal is stable.

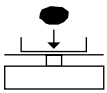
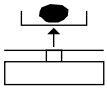
If these conditions are not met, an error message is displayed.

The weight required for calibration/ span adjustment is displayed. Standard calibration weights for selected models: to remove, see instructions on page 6.

Press (F) to select a different weight value.

To cancel the procedure: press and hold the (Enter CF) key (≥ 2 sec.).

Example: Calibrate/adjust span of the balance/scale (here: model ELT 6001)

Step	Key (or instruction)	Display
1. Switch on the balance/scale	(I/⏻)	
2. Zero the balance/scale	(Tare)	
3. Start calibration The preset calibration weight is displayed without the weight unit (in this example, 5000 g)	(CAL)	
4. To select a different calibration weight value	(F) repeatedly	
5. Confirm calibration weight value and adjustment After the zero point is stored, the required calibration weight flashes on the display.	(Enter CF)	
6. Place the required calibration weight on the balance/scale The readout stops flashing if the weight is applied within the defined time limit and tolerance. If the weight value is accepted, the display stops flashing and the stability symbol ⚖ appears on the display.		
7. Remove the calibration weight		
8. Calibration/span adjustment has been completed		

Configuration (Setup Menu)

To configure the balance/scale; i.e., adapt the balance/scale to individual requirements.

Step	Key (or instruction)	Display
1. Switch off the balance/scale	I/⏻	
2. Switch on the balance/scale and	I/⏻	
while all segments are displayed	Tare briefly	

Navigation in the Setup Menu

Key	Press briefly	Press and hold
Enter CF	Menu level: Move to the right (cyclical)	Confirm setting
F	Menu item: Scrolling	–
Tare	Menu level: Move to the left	Save settings and exit Setup

Parameter Settings (Overview)

o Factory setting √ User-defined setting

- Setup menu
  - 1 Weighing
    - 1.1. Adapt filter
      - 1.1.1 Very stable conditions
      - 1.1.2 o Stable conditions
      - 1.1.3 Unstable conditions
      - 1.1.4 Very unstable conditions
    - 1.2. Application filter
      - 1.2.1 o Final readout
      - 1.2.2 Filling
    - 1.3. Stability range
      - 1.3.1 1/4 digit
      - 1.3.2 1/2 digit
      - 1.3.3 1 digit
      - 1.3.4 o 2 digits
      - 1.3.5 4 digits
    - 1.5. Calib./adjust./linearization: Function of the Cal key
      - 1.5.1 o Calibration/span adjustment
      - 1.5.2 Linearization: for service personnel only
      - 1.5.3 Key blocked
    - 1.6. Auto zero
      - 1.6.1 o On
      - 1.6.2 Off
    - 1.7. 1st weight unit, or 2nd unit in Toggle Weight Units app.
      - 1.7.1 to 1.7.23 User-defined unit: see "Toggling between Weight Units"
  - 5. and 6. Only relevant with built-in data interface: see corresponding interface description
  - 8. Additional functions
    - 8.1. Block key functions
      - 8.1.1 All keys blocked except for I/⏻ and Tare
      - 8.1.2 o All keys unblocked
    - 8.2. Automatic shut-off
      - 8.2.1 o After 2 minutes
      - 8.2.2 After 5 minutes
      - 8.2.3 After 10 minutes
  - 9. Reset menu
    - 9.1. Factory settings
      - 9.1.1 Restore
      - 9.1.2 o Do not restore

Error Codes

Error codes are shown on the main display for approx. 2 seconds.
The program then returns automatically to the previous mode.

Display/Problem	Cause	Solution
No segments appear on the display	No power available	Check the power supply
	The AC adapter is not plugged in Battery is drained	Plug in the AC adapter Replace battery; recharge battery using external charger
oL	The load exceeds the balance/scale capacity	Unload the balance/scale
uL	Weighing pan not in place	Place the weighing pan on the balance/scale
	Something is touching the weighing pan	Move the object that is touching the weighing pan
d !SErr	Display overflow: Value cannot be shown on the display	Reduce load on the balance/scale
CALErr	Calibration parameter not met; e.g.: – Balance/scale not zeroed	Calibrate only when zero is displayed Press (Tare) to tare the balance/scale
	– Balance/scale is loaded	Unload the balance/scale
APPErr	Weight is too light or there is no sample on the balance/scale with application in use	Increase the weight on the balance/scale
PrtErr	Data interface for printing is blocked	Contact the Sartorius customer service center
bAL.Err	Balance/scale loaded or defective when power was turned on	Unload balance/scale before switching on or contact Sartorius customer service
SYS.Err	Balance/scale defective	Contact Sartorius customer service
Max. weighing capacity is less than indicated under “Specifications”	The balance/scale was switched on without the weighing pan in place	Place the weighing pan on the balance/scale and press (I/⏻)
The weight readout is obviously wrong	The balance/scale was not calibrated/adjusted before weighing Balance/scale not zeroed	Calibrate/adjust the balance/scale Zero the balance/scale

If any other errors occur, contact your local Sartorius customer service center.

Overview

Specifications

Model		GD502	ELT103	ELT602	ELT402	ELT202
Weighing capacity		500 ct	100 g	600 g	400 g	200 g
Readability	g	0.005	0.001	0.01	0.01	0.01
Tare range (subtractive)	g	500 ct	100 g	600 g	400 g	200 g
Linearity	≤±g	0.015 ct	0.003 g	0.03 g	0.03 g	0.035 g
Operating temperature range		10°C to 30°C (273°K to 303°K; 50°F to 86°F)				
Stabilization time (average)	s	2.5	2.5	2	2	2
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.1–0.8 (depends on filter level selected)				
Calibration weight	g	100 (F1)*	100 (F1)*	200 (F2)*	200 (F2)*	100 (F2)*
Net weight, approx.	kg	1.2	1.2	1.35	1.35	1.25
Pan size	mm	107 ∅	107 ∅	140×127	140×127	140×127
Power source/voltage/frequency		AC adapter, 230 V or 115 V, +15% to –20%, 48–60 Hz				
Power consumption (average)	W	1	1	0.8	0.8	0.8
Power requirements, DC voltage		12 V to 20 V				
Hours of operation with battery:						
– Mignon, AA alkaline manganese (2200 mAh), avg.	h	–	–	35	35	35
– Rechargeable 1500 mAh, fully ch., (NiMH), avg.	h	–	–	24	24	24

Model		ELT6001	ELT4001	ELT2001	ELT1001	ELT601	ELT6000
Weighing capacity	g	6000	4000	2000	1000	600	6000
Readability	g	0.1	0.1	0.1	0.1	0.1	1
Tare range (subtractive)	g	6000	4000	2000	1000	600	6000
Linearity	≤±g	0.2	0.2	0.2	0.2	0.2	2
Operating temperature range		10°C to 30°C (273°K to 303°K; 50°F to 86°F)					
Stabilization time (average)	s	2	2	2	1.5	1.5	1.5
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.1–0.8 (depends on filter level selected)					
Calibration weight	kg	5 (F2)	2 (F2)	2 (F2)	0,2 (F2)*	0,1 (F2)*	5 (M1)
Net weight, approx.	kg	1.25	1.25	1.25	1.1	1.1	1.1
Pan size	mm	140×127					
Power source/voltage/frequency		AC adapter, 230 V or 115 V, +15% to –20%, 48–60 Hz					
Power requirements, DC voltage		12 V to 20 V					
Power consumption (average)	W	0.8	0.8	0.8	0.6	0.6	0.6
Hours of operation with battery:							
– Mignon, AA alkaline manganese (2200 mAh), avg.	h	35	35	35	60	60	60
– Rechargeable 1500 mAh, fully ch., (NiMH), avg.	h	24	24	24	42	42	42

* = included in delivery

Accessories (Options)

Product	Order No.
Data interface, mounting kit	
– RS-232 interface with cable	**YADAP-RS**
– USB interface with cable	**YADAP-USB**
Data printer	**YDP03-0CE**
Lock-down capability (for anti-theft locking device)	**LC-1**
Calibration weights	
– for ELT6001 (5 kg; F2)	**YCW6548-00**
– for ELT4001/2001 (2 kg; F2)	**YCW6248-00**
– for ELT6000 (5 kg; M1)	**YCW655-00**
– for weight compartment, (rear side), (100 g; F1)	Available on request
Round glass draft shield (25 mm high)	Available on request
Weighing pan	
– Round	Available on request
– Rectangular	Available on request
Pan support	
– Round	Available on request
– Rectangular	Available on request
Leveling feet (set of one adjustable foot and one fixed foot)	Available on request
Plug for level indicator port	Available on request
Covers	
– Battery compartment	Available on request
– Interface port	Available on request
– Below-balance/scale port	Available on request
Weight compartment	Available on request

CE

Declaration of Conformity to Council Directives 89/336/EEC and 73/23/EEC (amended by Directive 93/68/EEC)

The electronic precision weighing instrument of the series ELT....:

meets the applicable requirements of the test standards listed below, in conjunction with the associated power supplies, auxiliary peripheral devices and installation equipment listed in Annex A2 (see Annex A1 for a technical description and a list of the individual versions).

1. Electromagnetic Compatibility
1.1 Source for 89/336/EEC: Official Journal of the European Communities, No. 2004/C98/05

EN 61326 Electrical equipment for measurement, control and laboratory use
EMC requirements

Limitation of emissions: Residential areas, Class B

Defined immunity to interference: Industrial areas, non-continuous operation

2. Safety of Electrical Equipment
2.1 Source for 73/23/EEC: Official Journal of the European Communities, No. 2004/C103/02

EN 61010 Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements
EN 60950-1 Information technology equipment
Safety
Part 1: General requirements

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